

To: Richard Norgaard, Chair  
Delta Independent Science Board

From: Jeffrey Mount, Member

Re: Comments on the Delta Independent Science Board's memo to the Delta Stewardship Council regarding multiple stressors

My apologies to the members of the DISB for missing the second day of our meeting January 12<sup>th</sup> and 13<sup>th</sup> to develop a Multiple Stressors memo for the DSC. I was not able to offer substantive input into the language of the memo, since this was all constructed on the second day.

I support all of the issues addressed by the memo and do not have substantive differences with either the content or the wording. There are numerous small edits that need to be made, but that can wait. However, I want to remind members of the DISB that this memo is to help guide planning by the DSC members (not merely an answer to an imperfectly crafted question from the legislature). This requires that it be succinct, to the point, and have clearly articulated recommendations.

In order to make this memo more effective, I recommend that it contain either an Executive Summary or a short list at the beginning that summarizes the observations and associated recommendations of the DISB. As Chair of the DISB it is appropriate that you, or your designate take responsibility for this. However, as a straw man, I attach just such a summary in order to stimulate discussion at our conference call on January 24<sup>th</sup>. My goal was to keep it to one page and have thus left out many of the details of the memo.

## Summary

The Delta Independent Science Board (DISB), with the assistance of the Delta Science Program (DSP), held a workshop on January 12<sup>th</sup> and 13<sup>th</sup> to evaluate the range of stressors affecting the Sacramento-San Joaquin Delta. This effort was conducted in response to requests from the legislature and the Delta Stewardship Council to help prioritize stressors. This memo summarizes the findings and recommendations of the DISB.

The DISB identified *at least* 40 different stressors that are affecting the co-equal goals of improving water supply reliability and ecosystem health, as well as managing the evolving Delta as place. These stressors have complex interactions and are operating at various scales on the Delta. In addition, some stressors can be classified as drivers, or processes that create stressors. The DISP believes it best to sort these into four general groups (Table 1): Globally-determined Stressor/Drivers, Legacy Stressors/Drivers, Anticipated Stressors/Drivers and Current Stressors/Drivers.

The Delta Plan should organize stressors relative to the Plan's objectives. All stressors should be explicitly linked to one or more key Delta attributes (ecosystem, water supply, flood risk, etc.) that they affect, and a management objective for that attribute. However, until the objectives are ranked in importance, it is not possible to rank the stressors. This will pose an important challenge for developing the Plan.

The DISP reminds the Council that the Delta is undergoing significant serial changes due to a variety of factors, many of which can only be adapted to rather than mitigated. Stressors that act over large length and time scales are the most important from a planning perspective, yet are often ignored or downplayed due to near-term political and social demands.

Objectives and policies developed to deal with multiple stressors have uncertain outcomes. The response of the Delta to management actions, whether positive or negative, is also likely to take long periods of time and generate surprises, particularly in light of on-going serial changes. For this reason the Plan must have a robust adaptive management program, supported by a strong science program, to manage multiple stressors.

*NOTE: for clarity it may be worthwhile to include the following, but it does not appear in an explicit manner in the current memo, although it is implicit. And it would be important to be sure that all members of the DISP agree with this:*

To date, the DISP has not received compelling evidence that only a few stressors are responsible for the decline in fish species of concern in the Delta. Nor have we seen compelling evidence that mitigating a few stressors is likely to result in a rapid recovery of these fishes. This may change as more analyses and experiments are conducted. However, until that time, the DISB recommends that the Delta Plan set broad, rather than narrow objectives that address stressors.